

Operating Instructions



Proportional Purging Gas Valve for Ex px Operating Equipment

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1. Safety

1.1 This Manual

This manual contains the information required to use the proportional purging gas valve in accordance with its intended purpose. It is addressed to technically qualified personnel.

Familiarity with and the technically perfect implementation of the safety instructions and warnings described in this manual are preconditions for safe installation and commissioning. The safety notes and warnings in this documentation are given in a general way and only qualified personnel will have the necessary specialised know-how to interpret and implement them correctly in specific individual cases.

This manual is an integral part of the scope of supply even if for logistical reasons it can be ordered and delivered separately. If you need any further information, please ask the BARTEC branch that is near you or responsible for your area.



It is essential to read and observe the contents of this documentation and this chapter in particular before you install and operate the proportional purging gas valve.

Keep this manual and other documentation relating to the proportional purging gas valve close to hand at all times.

Particularly important points in this documentation are marked with a warning symbol:



DANGER

Non-observance leads to death or serious physical injury. The necessary safety measures must be taken.



CAUTION

Warning of damage to property and financial and penal disadvantages (e.g. loss of guarantee rights, liability etc.).



ATTENTION

Important instructions and information on preventing disadvantageous behaviour.



NOTE

Important instructions and information on effective, economical and environmentally compatible handling.

1.2 Handling the product

The product described in this manual has been tested and left the factory in perfect condition as regards meeting safety requirements. To maintain this condition and ensure that this product operates perfectly and safely, it may be used only in the manner described by the manufacturer. Appropriate transportation, suitable storage, and careful operation are also essential for the perfect and safe operation of this product.

The safe and perfect mounting of the proportional purging gas valve on the pressurised control cabinet is a precondition for a perfect and correct mode of operation.

1.3 Use in accordance with the intended purpose

1.3.1 Use exclusively for its intended purpose

The proportional purging gas valve serves exclusively as a direct-action 2/2-way solenoid valve for inert gas or cleaned, dry instrument air and is intended for utilisation in explosion group II, category 2G and temperature class T4 (Ex II 2G Ex m T4). The electromagnets to control the valves serve to actuate valves which direct the flow of gaseous media.

The proportional purging gas valve is activated by a control unit. For this purpose the proportional purging gas valve is attached to the control unit.

The permissible operating data of the device being used must be complied with.

1.3.2 Improper use

Every other use is not in accordance with the intended purpose and can cause damage and accidents. The manufacturer will not be liable for any use over and above the exclusive intended purpose.

1.4 Owner/managing operator's obligations

The operator undertakes to restrict permission to work on the proportional purging gas valve to people who:

- are familiar with the basic regulations on safety and accident prevention and have been instructed in the use of the proportional purging gas valve;
- have read and understood the documentation, the chapter on safety and the warnings.

The owner/managing operator of electrical systems in hazardous areas is obligated under IEC 60079-19 and EN 60079-18 to have an electrical engineer check that these electrical systems (which include the proportional purging gas valve) are in proper condition.

The owner/managing operator checks the observation of the safety regulations and accident prevention rules valid for the respective application.

1.5 Safety Instructions

1.5.1 Electrical system

For electrical systems the relevant installation and operating regulations must be complied with (e.g. Directive 1999/92/EC, Directive 94/9/EC, Directive 98/37/EC and the applicable national ordinances, IEC/EN 60 079-0 et seqq and VDE 0100)!

The owner/managing operator of an electrical system in a hazardous (potentially explosive) environment must keep the operating equipment in an orderly condition, operate it correctly, monitor it and do the required maintenance and repairs (BetrSichV [German Ordinance on Industrial Safety and Health] and the applicable national ordinances and EN 60 079-14.)



DANGER

As a fundamental rule, work on live parts, with the exception of intrinsically safe circuits, is prohibited if there is a risk of explosion.

Before making any other connections, connect the protective earthing conductor to the PE terminal.

Make sure that only fuses of the specified type and nominal current strength are used. The use of bridged fuses or shorting jumpers is prohibited.

1.5.2 Installation

Before switching on for the first time, make sure the operating voltage agrees with the mains voltage.

As a basic rule, the adjusting wheel must be unscrewed when the protective gas is connected to the pressure reducer. This prevents pressure surges during commissioning if the pressure reducer was set at too high an outlet pressure.

1.5.3 Operation

If it can be assumed that safe operation is no longer possible, the device must be put out of operation and secured against restarting.

The proportional purging gas valve must be completely assembled before it may be operated.

Make sure the controller is switched on before you raise the pressure reducer's outlet pressure to its target level.

Only inert gas or cleaned and dry instrument air may be used as protective gas. In any case a filter must be placed upstream if the right quality with respect to the absence of foreign particles is not assured.



DANGER

Risk of suffocation when using inert gas as a purging gas.

Before opening, stop the supply of purging gas.

When opening, make sure the escaping purging gas cannot be inhaled directly.

1.5.4 Maintenance



Regular maintenance is not necessary if the unit is operated appropriately with due consideration to the installation instructions and the ambient conditions.

Always observe the currently applicable rules and the national regulations for the maintenance, servicing and inspection of the operating equipment!

Operating and maintenance work may be done only by trained and qualified specialists. The statutory rules and other binding directives relating to workplace safety, accident prevention and environmental protection must be observed.

Live parts can become exposed when covers are opened or parts removed (except those that can be opened or removed by hand). Connection parts may be live too.

1.5.5 Assembly/disassembly

The owner / managing operator may do only the necessary wiring work. Any further dismantling may be done only by the manufacturer or persons authorised by the manufacturer. The proportional purging gas valve is factory-sealed.



DANGER

Never open the devices. They are factory-sealed and may be opened only in the factory.

The pressurised compartment of the Ex p operating equipment may be opened only if it has first been ensured that the atmosphere is not potentially explosive and there is no connection to voltage.

The proportional purging gas valve may not be put into operation until it has been ensured that:

- the atmosphere is not explosive or
- the Ex p operating equipment enclosure is closed completely.

Assembly/disassembly may be done only by authorized qualified personnel. The statutory regulations and other binding directives relating to workplace safety, accident prevention and environmental protection must be observed.

The disposal of this equipment must comply with the national regulations on the disposal of waste.

1.5.6 Repairs

Repairs on explosion-protected operating equipment may be done only by authorised persons working in accordance with the latest developments in technology and using original spare parts. The relevant regulations must be observed. Please direct any questions you may have to BARTEC GmbH.

1.6 Standards conformed to

The proportional purging gas valve conforms to Directive 94/9/EC concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX Directive). Pursuant to this directive, the following standards serve as a basis for the proportional purging gas valve:

Standard	Designation
EN 50014:1997+ +A1:1999 +A2:1999	Electrical apparatus for potentially explosive atmospheres. General requirements
EN 50019:2000	Electrical apparatus for potentially explosive atmospheres Increased safety "e"
EN 50028:1987	Electrical apparatus for potentially explosive atmospheres Encapsulation "m"

1.7 Ex protection type marking and certification

The following markings showing Ex protection and certification are affixed to the device:

 II 2G EEx m II T4

PTB 00 ATEX 2202X

CE 0102

 II 2G EEx m II T4

PTB 00 ATEX 2094X

CE 0102

1.8 Warranty

As a basic rule, our "General Conditions of Sale and Delivery" apply. These are available to the owner/managing operator at the latest on formation of a contract. Guarantee and liability claims for personal injury and damage to property are excluded if they are to due to one or more of the following reasons:

- Use of the proportional purging gas valve for a purpose other than that for which it is intended.
- Incorrect installation, commissioning, operation and maintenance of the proportional purging gas valve.
- Non-compliance with the instructions in the manual with respect to transport, storage, assembly, commissioning, operation and maintenance.
- Structural alterations made to the proportional purging gas valve without our prior authorisation.
- Inadequate monitoring of components that are subject to wear.
- Repairs done incorrectly.
- Catastrophes due to the effects of extraneous elements or force majeure.

We guarantee the proportional purging gas valve and its accessories for a period of 1 year starting on the date of delivery from the Bad Mergentheim factory. This guarantee covers all parts of the delivery and is restricted to a replacement free of charge or the repair of the defective parts in our Bad Mergentheim factory. As far as possible, the delivery packaging should be kept for this purpose.

In the event of such a claim, the goods must be returned to us after written arrangement. The customer cannot claim to have the repairs done at the site of installation.



DANGER

No modifications or conversions may be made unless the manufacturer gives his approval in writing.



DANGER

Use only original spare parts and original expendable parts. It cannot be guaranteed that parts procured from other suppliers will have been designed and produced in conformance with safety requirements and with the necessary stress tolerance.



NOTE

The manufacturer grants a complete guarantee only and exclusively if the spare parts have been ordered from him.

2. Product Description

The proportional purging gas valve is a direct-action 2/2-way proportional solenoid valve and it is used to introduce purging gas into a piece of pressurised operating equipment for Zones 1 or 2. The proportional valve technology assures compensation for the actual leakage in the Ex p equipment. It is actuated by an APEX control unit.

The proportional purging gas valve is particularly suitable for neutral media such as inert gases and instrument air.

2.1 Function

No operating or differential pressure is necessary for the proportional purging gas valve to function. The valve switches from 0 bar on.

The 2/2-way solenoid valve opens in proportion to the applied electric current. The sealing plug is raised from the seat by the magnetic drive alone.

In the de-energised condition the solenoid valve is closed. The special design and geometry of the parts inside the valve allow a soft closing function with only very slight pressure peaks.

2.2 Picture of the product



2.3 Variants

Order number	Voltage	Nominal diameter	Connection
05-0056-0047	AC 230 V, 50 Hz	2	1/4"
05-0056-0048	AC 110 V, 50 Hz	2	1/4"
05-0056-0022	AC 230 V, 50 Hz	6	3/8"
05-0056-0024	AC 110 V, 50 Hz	6	3/8"



CAUTION

Valves 05-0056-0022 and 05-0056-0024 may be operated only with a 15W APEX control unit. Operating the valves on a 7W APEX control unit will destroy the control module installed in the APEX control unit!



NOTE

When an APEX control unit is ordered, the valve type being used should be specified. This ensures that the APEX control unit will be set correctly because factory settings to the respective valve type on the APEX control unit are necessary.

2.4 Selection table for purging air nozzle



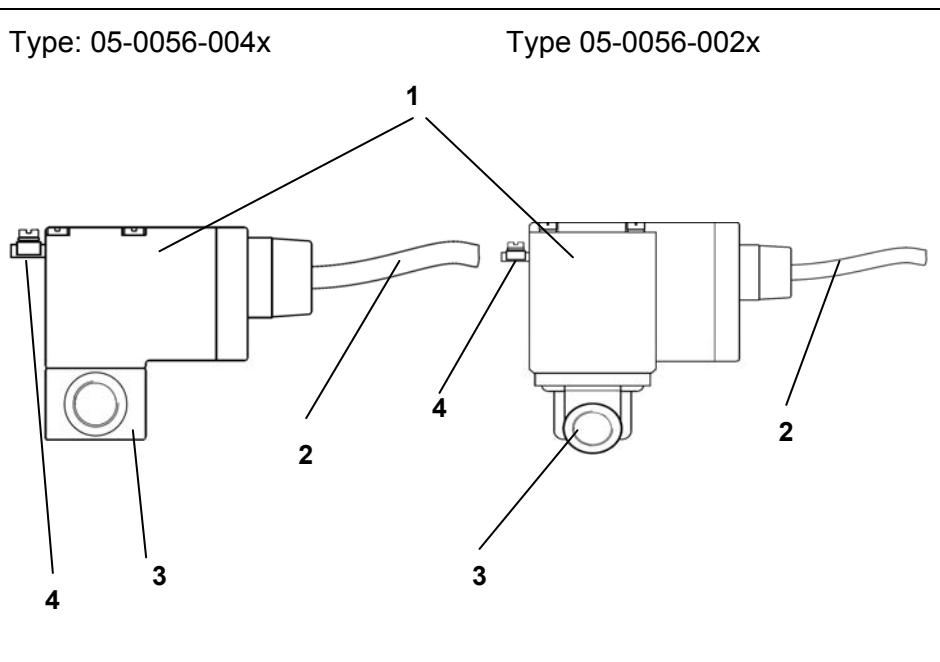
NOTE

The following selection table applies only to valves 05-0056-0022 and 05-0056-0024.

Valves 05-0056-47 and 05-0056-0048 are suitable only for Ex p operating equipment with a maximum internal capacity of 50 l.

Capacity of Ex p operating equipment	Size of pressure reducer	Purging air nozzle	Orifice plate APEX control unit
Less than 50 l	1/4"	Ø 2.8 mm	12 mm
50 to 150 l	1/4"	Ø 3.9 mm	15 mm
150 to 300 l	1/4" or 3/8"	Ø 3.9 mm	15 mm
300 to 700 l	3/8" or 1/2"	Ø 4.5 mm	18 mm
700 to 1000 l	1/2"	Ø 4.5 mm	18 mm or 2 x 18 mm
as of 1000 l	1/2"	Ø 5.5 mm	2 x 18 mm

2.5 Construction of the proportional purging gas valve



Item	Component
1	Coil body
2	Connection cable
3	Valve body with G connecting thread
4	Earthing connection

3. Mounting

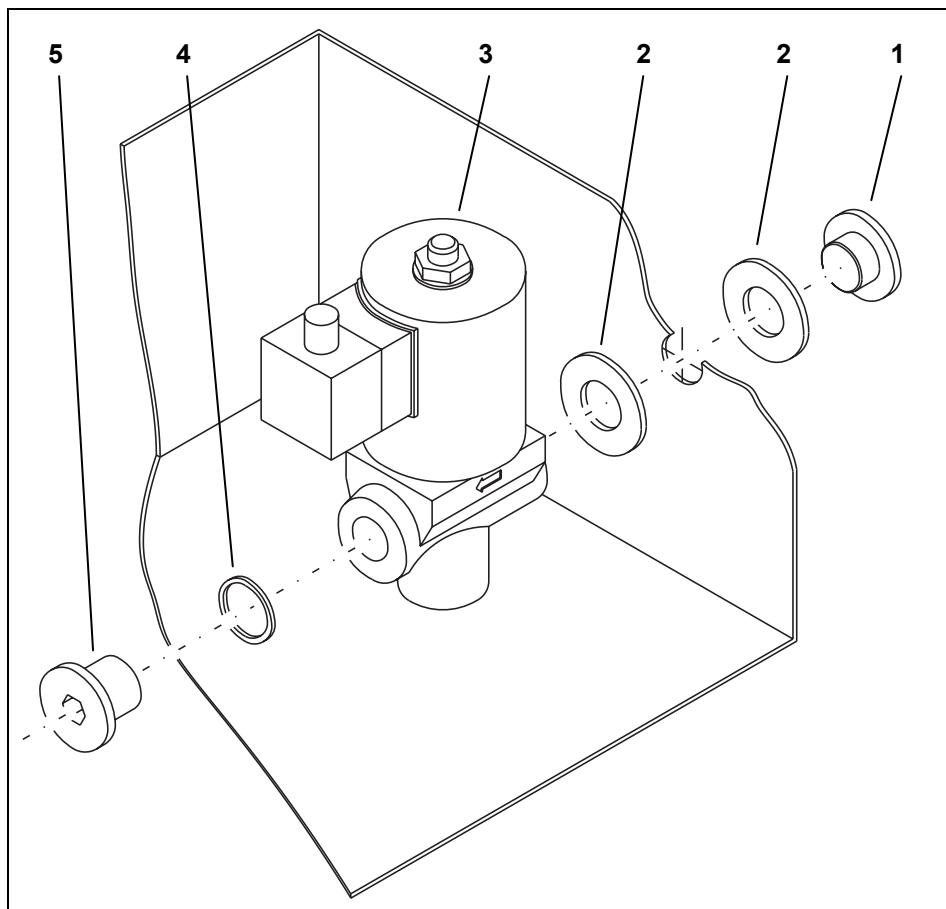
3.1 Mounting

- a) Decide on the position on the wall for mounting the Ex p operating equipment enclosure.
- b) Drill a XX-mm-diameter borehole into the enclosure wall.
- c) Mount the proportional purging gas valve in accordance with the following drawing. The mounting parts are included in the scope of supply.



ATTENTION

Pay attention during installation to the proportional purging gas valve's direction of flow. The purging gas must flow into the Ex p operating equipment. The flow direction is specified on the valve body.



Item	Designation
1	Bulkhead union
2	Washers
3	Proportional purging gas valve
4	Sealing ring
5	Purging air nozzle

3.2 Electrical Connection



ATTENTION

The proportional purging gas valve must always be operated with a fuse.

If the proportional purging gas valve is operated in connection with an APEX control unit, the fuse must be installed in the APEX control unit.



CAUTION

The proportional purging gas valves 05-0056-0022 and 05-0056-0024 may be operated only with a 15W APEX control unit. Operating the valves with a 7W APEX control unit will destroy the control module that is installed in the APEX control unit!

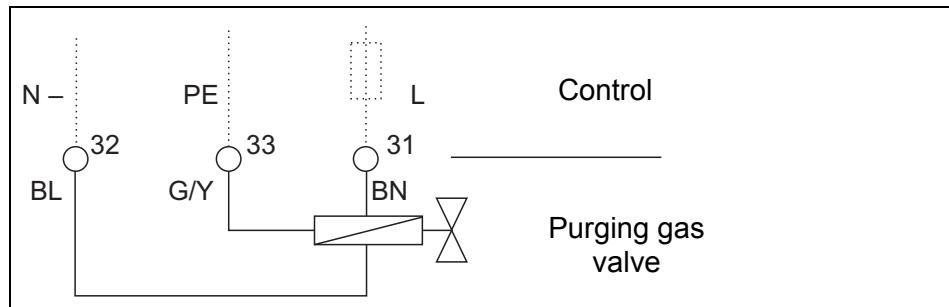
The fuse for the purging gas valves is installed in the Ex d control module in the APEX control unit. For this reason it is important to operate the proportional purging gas valve with the correct type of the APEX control unit as otherwise the control module can be destroyed.



NOTE

Only the manufacturer can replace the valve fuse in the APEX control unit if it is defective.

Connect the proportional purging gas valve as follows:



The cores have distinguishing colours:

Designation	Core colour	Connection
BN	brown	L at terminal 31 in the control
BL	blue	N at terminal 32 in the control
GN/YE	green/yellow	PE at terminal 33 in the control

4. Commissioning

4.1 Inspections before commissioning

Before putting into operation for the first time, check that:

- the proportional purging gas valve has been installed in compliance with regulations,
- the connection has been established properly,
- the proportional purging gas valve is not damaged,
- all screw connections have been tightened securely.

4.2 Commissioning

As soon as the control unit is switched on, the proportional purging gas valve connected to it starts operation automatically. The proportional purging gas valve is not commissioned separately.

5. Operation

After commissioning, the proportional purging gas valve starts operating automatically by means of the control to which the proportional purging gas valve is attached.

Any losses through leakage from the Ex p operating equipment are compensated automatically.

There are no separate controls on the proportional purging gas valve.

6. Maintenance and Care

The proportional purging gas valve is virtually maintenance-free when operated under the conditions described in these instructions.

Use a damp cloth to clean the outside of the proportional purging gas valve when necessary.



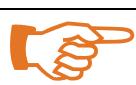
ATTENTION

Do not use any aggressive, abrasive or dissolving detergents.



DANGER

Before starting maintenance work on the Ex p operating equipment, make sure the proportional purging gas valve is closed and the protective earth connection is connected!



ATTENTION

Valve and pressure reducer are under pressure.



DANGER

Danger of suffocation when using inert gas as a protective gas.

Before opening, stop the supply of protective gas.

When opening, make sure the escaping protective gas cannot be inhaled directly.

7. Malfunctioning and Troubleshooting

Before looking for the fault, check that the components are mounted and connected correctly (see "Mounting" section).



NOTE

The following table with descriptions of faults and information on possible causes presupposes that the components have been mounted and connected correctly.

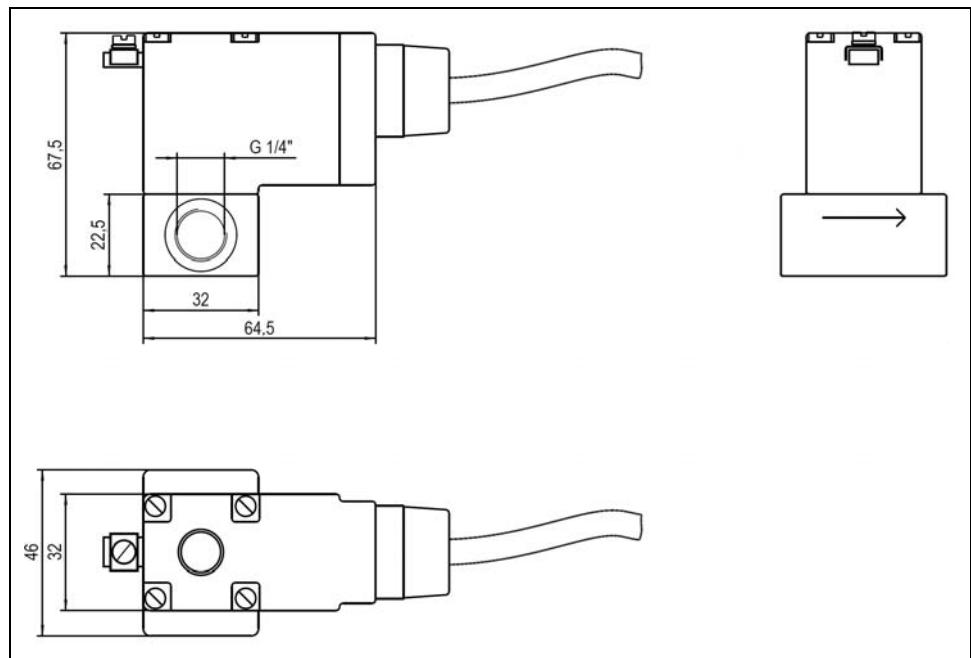
Fault	Possible cause	Remedy
Proportional purging gas valve doesn't open	no voltage	Check voltage supply, cable connection and fuse.
	short circuit	Find and repair the cause
	coil defective/interrupted	Replace proportional purging gas valve.
	core area dirty	Replace proportional purging gas valve.
Rate of air leakage is too low	Ex p operating equipment enclosure is not leak-tight	Check the leak-tightness of the operating equipment and the loss through leakage.
	Purging gas pressure is insufficient	Adapt the pressure to the requirements and if necessary increase the line's cross section.
	Insufficient power in the purging gas source	Adapt power to the requirements
	Purging gas piping contaminated or clogged	Check and if necessary clean piping.

8. Technical data

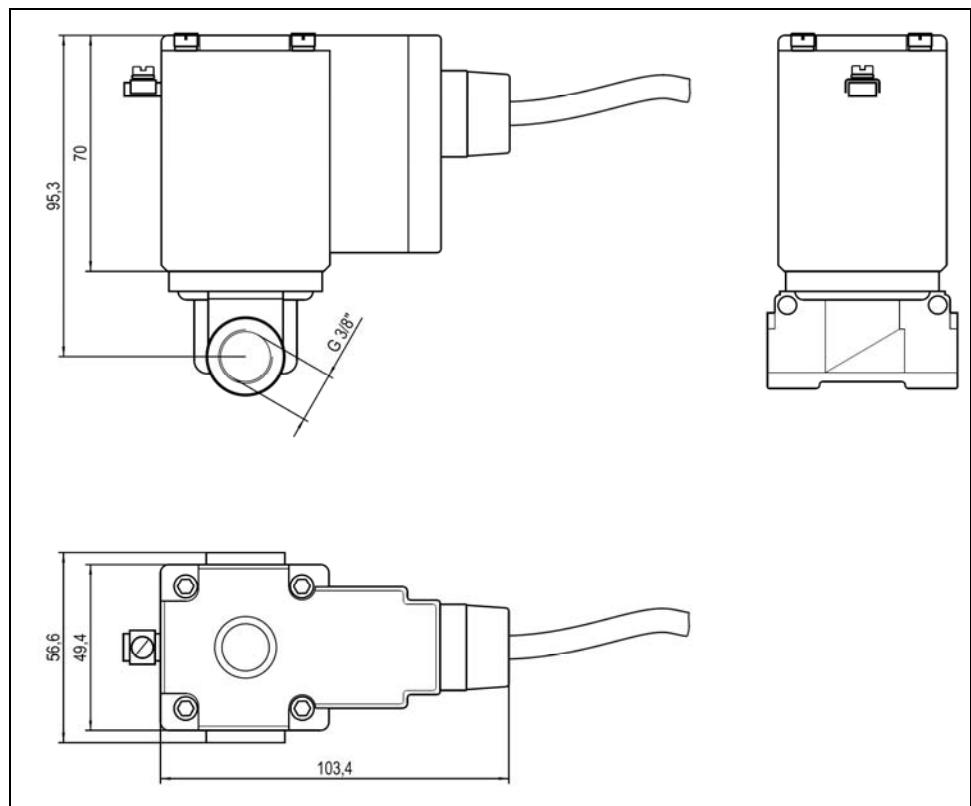
Parameters	Data
Type	See section 2.3
Bauart	servo-assisted solenoid valve
Area of use	 II 2G
Type of protection	EEx m II T4
Approvals	
– 05-0056-0022 and -0024	PTB 00 ATEX 2202X
– 05-0056-0047 and -0048	PTB 02 ATEX 2094X
Protection class	IP 65
Nominal diameter	
– 05-0056-0022 and -0024	DN 6.0
– 05-0056-0047 and -0048	DN 2.0
Installation position	Magnet on top
Pressure range	
– 05-0056-0022 and -0024	0 to 4 bar
– 05-0056-0047 and -0048	0 to 8 bar
max. flow	
– 05-0056-0022 and -0024	max. 750 l/min
– 05-0056-0047 and -0048	max. 130 l/min
Enclosure material	Brass
Sealing material	FKM
Flow media	cleaned instrument air (class 543) or inert gas
Temperature of the medium	0 °C to +40 °C
Ambient temperature	-10 °C to +60 °C
Valve connection	
– 05-0056-0022 and -0024	G 3/8"
– 05-0056-0047 and -0048	G 1/4"
Electrical connection	captive cable
Voltage/power consumption	
– 05-0056-0022	AC 230 V, 50 Hz, 15 W
– 05-0056-0024	AC 110 V, 50 Hz, 15 W
– 05-0056-0047	AC 230 V, 50 Hz, 8 W
– 05-0056-0048	AC 110 V, 50 Hz, 8 W
Voltage tolerance	± 10% according to VDE 0580
Duty cycle	100% DC
Nominal operation	Continuous operation

9. Dimensions

9.1 Dimensions of proportional purging gas valve G1/4"



9.2 Dimensions of proportional purging gas valve G3/8"



10. Declaration of EC Conformity

10.1 Declaration of EC Conformity 05-0056-0022 and -0024 (PTB 00 ATEX 2202X)



EC DECLARATION OF CONFORMITY

As manufacturer, **Bürkert Werke GmbH & Co. KG** herewith declares that these products comply with the requirements of the Directives of the Committee for the Harmonization of the Legal Regulations of Member States concerning

- electrical equipment with rated voltages of 50-1000 V AC respectively 75-1500 V DC (Low Voltage Directive 73/23/EC),
- electromagnetic compatibility (89/336/EC)
- equipment and protective systems intended for use in potentially explosive atmospheres (ATEX, 94/9/EU).

The following standards were consulted with respect to the compliance with the **Low Voltage Directive**:

EN 50178	Power current equipment with electronic devices
EN 60730-1	Automatic electrical controlling and regulating equipment
EN 60664-1	Insulation coordinates for electrical equipment in low voltage installations
EN 60529	Methods of protection through the enclosure (IP code)
EN 60204-1	Safety of machines
VDE 0580	Electromagnetic devices, general requirements

The following standards were consulted for assessing the devices with respect to **electromagnetic compatibility**:

EN 61000-6-2	Basic specification interference transmission; Part 2: Industry
EN 61000-6-2	Basic specification interference immunity; Part 2: Industry

For the assessment of the products according to the **ATEX directive** one or several of the following standards were used. The used standards are listed in the EC type-examination certificate.

EN 60079-0	Electrical apparatus for explosive gas atmospheres - Part 0: General requirements This standard will replace the standard EN 50014
EN 60079-1	Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosures "d" This standard will replace the standard EN 50018



EN 60079-7	Electrical apparatus for explosive gas atmospheres - Part 7: Increased safety "e" This standard will replace the standard EN 50019
EN 60079-11	Electrical apparatus for explosive gas atmospheres - Part 11: Intrinsic Safety "i" This standard will replace the standard EN 50020
EN 60079-15	Electrical apparatus for explosive gas atmospheres - Part 15: Construction, test and marking of type of protection, "n" electrical apparatus This standard will replace the standard EN 50021
EN 60079-18	Electrical apparatus for explosive gas atmospheres - Part 18: Construction, test and marking of type of protection encapsulation "m" electrical apparatus This standard will replace the standard EN 50028
EN 13463-1	Non-electrical equipment for potentially explosive atmospheres - Part 1: Basic method and requirements
EN 13617-1	Petrol filling stations - Part 1: Safety requirements for construction and performance of metering pumps, dispensers and remote pumping units
EN 50281-1-1	Electrical apparatus for use in the presence of combustible dust

The production of the electrical units with a EC type-examination certificate is audited by

PTB (Physikalisch-Technische Bundesanstalt)

Bundesallee 100

38116 Braunschweig

The units will be marked with CE0102. The EC type-examination certificate is part of the manual where the number will be found as well.

The used and valid standards are listed in the EC type-examination certificate. For the other standards the valid version at the delivery of the product was used.

Ingelfingen, 24.01.2006

Ort und Datum

Otto Walch

Certifications Manager

10.2 Declaration of EC Conformity 05-0056-0047 and -0048 (PTB 02 ATEX 2094X)

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EN 60079-18	Electrical apparatus for explosive gas atmospheres - Part 18: Construction, test and marking of type of protection encapsulation "m" electrical apparatus This standard will replace the standard EN 50028
EN 13463-1	Non-electrical equipment for potentially explosive atmospheres - Part 1: Basic method and requirements
EN 13617-1	Petrol filling stations - Part 1: Safety requirements for construction and performance of metering pumps, dispensers and remote pumping units
EN 50281-1-1	Electrical apparatus for use in the presence of combustible dust

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